BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

Sedus Stoll Aktiengesellschaft, 79746 Waldshut

Backrest

Description

TECHNICAL FIELD

The invention relates to the field of seating furniture, in particular a backrest for an office chair, in which a membrane is clamped in a frame.

PRIOR ART

It is known in the case of office chairs to attach the backrest to the backrest support in such a way that it is able to follow as far as possible all the movements of the user's back. In technical terms, this means that the backrest is cardanically mounted, that is to say is movable about the three spatial axes. Consequently, it can follow sagittal movements of the back, that is movements about a horizontal axis parallel to the body, but also torsional movements and transversal movements, that is movements about the vertical axis and about a horizontal axis perpendicular to the body. Such combined upper body movements in three directions occur very frequently in practice, for example when reaching down sideways into the drawer of a desk, or when turning towards another person during conversation. Cardanic bearings for backrests on chairs are also referred to as "dorsokinetically flexible joints".

A chair of the type described is known for example from EP 0308538 A. In the case of this known chair, the cardanic mounting is achieved by the backrest having a spherical segment-shaped formation, which is mounted in a second spherical segment-shaped formation on the backrest support. The centre point about which the

backrest can move lies on the surface of the padding. Laterally and above and below the cardanic joint, spring elements are provided between the backrest and the backrest support, for example elastic polyester elements, which exert spring forces both perpendicularly and parallel to the surface of the backrest.

Although this known chair offers outstanding sitting comfort, there is a certain degree of complexity involved in its production.

Another chair with a cardanically mounted backrest is known from EP 0935934 A. The cardanic mounting is achieved there by means of a circular-cylindrical elastomeric element, on the two end faces of which there is respectively vulcanized a steel plate, which is connected to the backrest and the backrest support by screws. The user can consequently move the backrest against the spring forces of the elastomeric element. In addition, the backrest support can also be pressed rearwards against a recovery spring. On its user surface, the padding is in principle made to be rigid and is bent in the region of the rubber bearing.

Although this known chair has the advantage that the cardanic bearing comprises fewer individual parts, and can consequently be produced at lower cost, the conventional design of the user surface of the backrest padding does not achieve optimum support for the user's back. Furthermore, the articulation of the backrest support on the chair pedestal and the attachment to a recovery spring is also very complex and consequently costly. Finally, it is also disadvantageous that the elastomeric bearing does not offer any protection against breaking away: if the plates vulcanized onto the elastomeric element become detached, the backrest falls off the backrest support.

Another chair of the type stated is known from DE 100 48 779 A1: in the case of this chair, the backrest is

formed as a frame with a membrane clamped in it. The frame comprises two essentially vertically running side parts, and an upper and lower cross-piece, connecting the two side parts. At the lower cross-piece, the frame is suspended by means of a dorsokinetically flexible joint on the upper part of a backrest support, which consists of aluminium and is articulated with its fork-shaped lower part on the tilting mechanism.

Although this chair offers a very high degree of sitting comfort, it is also relatively complex in technical production terms, and can also still be further optimized with regard to the dorsokinetic support of the lumbar lordosis.

Finally, US 5,810,438 A also discloses a chair, in which the back part, the seat part and the two armrests are interconnected in one piece. Provided as an option between the seat and the backrest is a spring part, which is likewise connected in one piece to the seat and backrest. The known chair is an injection moulding and is produced by the gas injection technique (GIT).

The known chair has notable advantages in production, because the number of components and the assembly steps are reduced to a minimum. However, it has disadvantages with respect to sitting comfort, because the backrest is actually suspended on the armrests, and even more so when the central spring part is provided, so that the user's requirements with regard to flexible support of the back are satisfied only to a very limited extent.

SUMMARY OF THE INVENTION

It is therefore the object of the invention to develop a backrest of the type described in DE 100 48 779 A1 in such a way that on the one hand it offers the user's back optimum support in the case of all possible movements, whether sagittal, transversal or torsional, but on the other hand it can nevertheless be produced at low cost, in particular requires minimal production

complexity for large numbers of units. Nevertheless, a high level of stability of the construction in tough everyday use is of course also to be ensured. Finally, the backrest according to the invention is also intended to represent an optimum solution aesthetically, from the criteria of industrial design. This object is achieved by the features of Claim 1 and of the subclaims.

The essence of the invention is the idea of connecting the frame to the backrest support in one piece, that is of making the frame and the backrest support as a one-piece component, the two legs of the backrest support running together in a connecting piece, and the connecting piece running smoothly and uninterruptedly into the lower cross-piece of the frame. This component takes the form of an injection moulding made of a glass-fibre-reinforced polyamide resin, preferably a polyarylamide, and is produced by the gas injection technique (GIT), allowing largely hollow individual parts to be produced. The construction according to the invention achieves the effect that the backrest on the one hand allows the membrane to develop optimal supporting forces for the user's back, but on the other hand brings about a cardanic-elastic connection between the backrest and the backrest support in an elegant and technically low-cost way.

The invention also makes it possible to form the backrest together with the backrest support as a visible part, that is without any special covering, which not only reduces the number of individual parts, and consequently the production complexity, but also produces a distinctive form and creates a high recognition value.

The number of structural elements of the backrest according to the invention is also reduced to a minimum, and consequently keeps down the production complexity. Largely hollow plastic parts achieve the effect of a very low weight. At the same time,

however, the backrest according to the invention nevertheless has a most particularly high degree of stability, since breaking away of the backrest from the support under the effect of force is obviously no longer possible because of the one-piece configuration. Furthermore, the backrest according to the invention with the chosen dimensioning and the chosen plastic has a very high level of rigidity and resistance to mechanical stress.

In comparison with the dorsokinetically flexible suspension of the backrest on an aluminium support, the backrest according to the invention has the further advantage that ergonomically desired elastic supporting forces for the user's back are also provided by the backrest support, while the aluminium support is rigid.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is explained in more detail below on the basis of an exemplary embodiment represented in the drawings, in which:

Figure 1 shows the perspective view from the front of a backrest according to the invention with an assembled bearing for the neck support,

Figure 2 shows the same view as Figure 1, but with the attachment of the neck support in an exploded representation, and

Figure 3 shows a side view of the backrest represented in Figures 1 and 2.

WAYS OF IMPLEMENTING THE INVENTION

Represented in the figures is a backrest according to the invention, which comprises the frame 1, the backrest support 6 and the neck support 15.

The frame 1 comprises the left-hand side part 2 and the right-hand side part 3. These two side parts 2, 3 are interconnected by means of the lower cross-piece 4 and the upper cross-piece 5.

The side parts 2, 3 have on the outside a groove 26, into which a membrane (not depicted) consisting of an elastic fabric is clipped with its welt-enclosed side edges.

Also provided are strip-shaped holders 16, 17, which are moulded on the side parts 2, 3 and into which a band can be clipped as a special lordosis support.

The backrest support 6 comprises the left-hand leg 7 and the right-hand leg 8, which run together in a fork-shaped manner in the connecting piece 18. The connecting piece 18 runs smoothly and uninterruptedly into the lower cross-piece 4. At the front, the legs 7, 8 have bearing blocks 9, 10, on which the rear part of the seat panel (not depicted) is mounted. Right at the front, the legs 7, 8 have recesses 22, in which metal fittings 11, 12 are inserted and firmly screwed. By means of these fittings 11, 12, the backrest support 6 is articulated on the tilting mechanism (not depicted) of the chair. The mechanism described in DE 196 40 564 A, with synchronous control of the seat and backrest, may be used for example as such a tilting mechanism.

Fastened by means of screws in the middle of the upper cross-piece 5 is a metal fitting 13 with a bearing 14 for the neck support 15. The neck support 15 is pivotably mounted in the bearing 14 by means of the complementary bearing part 23 on the sleeve 19. The pivotability is brought about to a predetermined degree by the sliding block 24, which can move in the suitably shaped inner part of the bearing 23. By means of the cup springs 25, which are under the effect of the screw 27, a frictional force is produced on the bearing 23, making it possible for the neck support to be pivoted but then fixed in a desired position. The neck support 15 can be adjusted in height by moving the bar 20 in the sleeve 19. The head cushion (not depicted) is fastened on the supporting plate 21.

The plastic mouldings of the backrest are largely hollow. Only in the middle part of the upper cross-piece 5 and in the lower parts of the two legs 7, 8 of the backrest support 6 is the moulding compound compact. This is expedient to allow the screws for the fittings 11, 12 and 13 to have a firm hold.

By contrast with the backrest known from DE 100 48 779 A1, in the case of the backrest according to the invention that is described here the leaning force produced by the user is absorbed not only by the backrest frame but also by the backrest support that is moulded on in one piece. This increases the dorsokinetic supporting function of the backrest in an advantageous way.

The polymer compound used is a glass-fibre-reinforced thermoplastic resin based on polyarylamide, preferably the material sold by the company Solvay S.A. under the name IXEF 1022 or 1032.

The mouldings are produced by the gas injection technique (GIT), the molten moulding compound being forced onto the mould wall by an inert gas, preferably nitrogen, injected under high pressure into the cavity of the injection mould.

The production of the backrest together with the moulded-on backrest support by means of the injection-moulding technique described is obviously of inestimable value in the production of large numbers of units with regard to the production and assembly complexity. As the exemplary embodiment discussed convincingly shows, the backrest according to the invention has all the advantages required by the object: it brings about outstanding sitting comfort by optimum support of the back, can be produced, transported and assembled with considerably reduced complexity in comparison with the prior art, and from the aspect of industrial design offers a high level of aesthetics and distinctiveness of form.

List of designations

1 frame
2 left-hand side part
3 right-hand side part
4 lower cross-piece
5 upper cross-piece
6 backrest support
7 left-hand leg
8 right-hand leg
9 left-hand seat bearing block
10 right-hand seat bearing block
11 left-hand fitting
12 right-hand fitting
13 fitting for neck support
14 bearing for neck support
15 neck support
16 left-hand strip holder
17 right-hand strip holder
18 connecting piece
19 sleeve
20 bar
21 supporting plate
22 recess
23 bearing on neck support
24 sliding block
25 cup springs
26 groove for membrane welt
27 screw for bearing of neck support